

A SURVEY OF THE GERMAN
NARROW FABRICS INDUSTRIES
INCORPORATING "LIM BRACES INDUSTRY

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TABLE OF CONTENTS

Subject		Page No.
Part I.	Introduction	1
Part II	General Comments	3
	General Conditions	3
	Standard of the German Factories	3
	Hours of Work	4
	Use of Labour	4
	Rates of Pay	5
	Statistics	6
	Wartime Organization	8
	Materials Used	9
Part III.	(a) Machinery of General Interest	10
	Preparatory processes	1
	Weaving	1
	Braiding	0
	Measuring and wrapping	1
	(b)Narrow Fabric Machinery Makers	2
		2
		0
Part IV.	Sectional Surveys	2
	Fire Hose Industry	3
	Heavy Solid Woven Belting	2
	Rigid Webbing	4
	Elastics	
	Smallwares	
	Trimmings	
	Ribbons	2
	Plain Tapes	9
	Braces (Men's Wear)	2
Part V.	Factories Investigated'	9
		4
		2
		5
		1
		5
		3
		5
		8

62
64
65
66

69

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PART I.

Introduction

In the United Kingdom the term "Narrow Fabrics Industry" has been applied to a miscellaneous collection of comparatively small sections of the Textile Industry. In general, it may be taken as covering:- (a) any textile, not exceeding 18" in width, produced with two self edges, and (b) most forms of braids. During and since the war, the grouping of these sections has been modified to facilitate general arrangements for licensing and material distribution, etc. Solid woven belting has been included, regardless of width, also woven fire hose and the productions of needle trimming looms of Sander & Graf type. Covered wire braiding has been excluded and, because of their affinity with the Cordage Industry, sash lines, blind cords, etc. have been regarded as outside the immediate field of Narrow Fabrics.

Representatives were appointed from different branches of the British Narrow Fabrics Industry to investigate in Germany a range of activities similar to the British classification of Narrow Fabrics.

As webbing is the principal component of Braces (men's wear), an investigation of the German Braces Industry was carried out at the same time.

The terms of reference were 'to carry out as wide a survey as possible of the Narrow Fabrics Industries and the Braces Industry.

To obtain the latest available information on machinery developments, a number of factories making machinery for the Narrow Fabrics Industry were visited.

The investigations were made in May, 1946.

The information collected indicated that most of the factories were to be found in the British and Russian zones of Germany, with considerably smaller numbers in the American and French zones. It must be emphasised that the Russian zone was not visited and, as a consequence, this report cannot be regarded as exhaustive, particularly for some sections of the Industry where the main centres are located in that zone. Especially does this apply to beltings, fire hose and needle trimmings.

Investigations were made at approximately ninety factories in the British zone, thirteen in the American zone, and four in the French zone. It is considered that these permitted a reasonable cross section assessment of the standards and conditions in those zones of the activities under consideration.

All documents mentioned herein have been lodged with: Board of Trades German Divisions (Documents Unit), Lansdowne Houses Berkeley Square, W-1.

Telephone:- Grosvenor 4060. Ext. 2923.

All applications for permission to inspect these documents should quote -the' relevant BIOS- reference number.

PART II.

GENERAL COMMENTS

General Conditions

War damage to the factories was considerable. A few factories could not be traced at all, whilst many were destroyed completely. Damage to the majority was in excess of 30% of their normal activity (the figure is a rough estimate). The few that were intact were in country areas. Very little information could be collected about factories in the Russian zone.

The main centre for smallwares and (apart from the Russian zone) for trimmings is the Wuppertal district, in the British zone. Narrow Fabric productions in this locality are in large part confined to braiding, ribbon and webbing weaving, Jacquard smallware weaving, and the building of the requisite machinery, both for the productions themselves and for ancillary processes. Since the cessation of hostilities, the lack of fuel and raw materials restricted most of the Industry's activities to whatever could be made with existing stocks. In a very few instances additional materials had been made available by the authorities for specific purposes.

The difficulties of transport were enormous. Not only were all forms of conveyance in exceedingly short supply, but the lines of communication were disjointed.

Standard of the German Factories

For the greater part the factory buildings were old; few appear to have been built within the last forty years, and the equipment installed therein appeared to be of a corresponding age. The impression gained was that there had not been any outstanding development during recent years in the Industry, probably due to the decline in exports from 1928 onwards, which left surplus production in the home market and caused extensive unemployment.

There was no pronounced trend towards the increased use of High speed or automatic machinery, nor of mass production methods, although reference will be made later in the report to a small-scale tendency towards automatic winding and some high-speed braiding machines.

It is interesting to note that there was no evidence that attempts had been made to produce a single-head high-speed smallware loom. Very few imported looms of this type were seen installed.

The general lay-out was usually cramped and unremarkable. No examples were seen where the lay-out was superior to the better British factories, and for the most part they could be regarded as below the average standard in this country.

The standard of artificial illumination was also low and old fashioned, and no installations of fluorescent or other forms of modern lighting were seen.

The majority of power transmission was by overhead belt drives; individual motors and group drives were used less than in Britain.

Factory safety regulations were either less rigorous than in this country or were disregarded. Not only was there great danger from unguarded belts and pulleys, but also the light and electrical installations often appeared to be inadequately insulated. No doubt war conditions and inability to keep up with maintenance requirements accounted for some of this laxity.

Little evidence was seen of reasonable provision for canteen and welfare facilities. It was exceptional, in this Industry, to find a good canteen.

Hours of Work

Before the war, two and three shift working was the general practice but at the time of the visit, due to the shortage of raw materials, fuel, etc., the hours worked per week varied from 24 to 40 and averaged between 30 and 35. Many firms stopped work each day at 3.0 P.m. and others worked mornings only.

Use of Labour

The investigations were made at a time when conditions were abnormal, but the impression received was that factories were working simply to create some form of employment for the greatest number of regular hands that the fuel and raw material position would allow; consequently, there was no apparent effort to achieve

maximum production per operative, and although piecework arrangements operated in some factories, the general rate of production was slow. Frequently, the attitude seemed to be that work was done to present a facade of employment, thus maintaining a semblance of continuity with the ultimate aim of being ready when supplies could be made available. No attention was paid to economy of effort, and there was little to compare with the arrangements made in this country during the war for standardised productions. On the contrary, labour was used extravagantly and there was a tendency to put as much work as possible into the goods, resulting in the production of luxury articles. For example, it was noted that very many fancy belts for ladies were being woven, sometimes with jacquard ribbon trimming braids sewn on to rigid web, and good quality ribbons were being sewn together to be made up into skirts decorated with trimming braids, etc. Under the circumstances it was impossible to assess the normal productive potential of the workers.

Even pre-war, there was evidently considerably more home working than in this country, and it is probable that war conditions and the advantages of dispersed production tended to increase the proportion. Many of the weaving and trimming firms relied to a large extent on production by home workers. Prepared materials (warp and weft) were supplied by the mill without charge, and the home worker was then paid on a piece-work basis for the operations performed.

Rates of Pay

Wages during the war were stabilised by a Government decree at the pre-war rate, and no increases have been allowed since.

Average wages in pfennigs per hour were:

Unskilled women	between 45 and 60
Skilled	55 & 75, generally about 65
Unskilled men	70 & 80
Skilled	from 80 up to 125, generally about 1 Mc.

In some cases, the above were increased 15% or 20% by piece work earnings and in others there were also bonus schemes, but neither of these systems appeared to be used as much as in Britain.

The arbitrarily fixed exchange rate of the mark (40 to the 41) could not be taken as a proper basis for comparison with British rates.

An average pre-war value of the mark would be 12 to the £1, and it is interesting to note that rough and ready estimates to judge the relative purchasing power in rationed goods indicated that the foregoing wage rates were worth between 9d. and 1s. for women and 1s. to 1s. 6d. per hour for men.

Statistics

As anticipated, the grouping of the German Industries for statistical purposes did not coincide with the British arrangements for the Narrow Fabrics Industries, but enquiries resulted in tracing a Dr. Lünenschloss who, it was stated, had acted during the war years in the capacity of Controller of the Fachuntergruppe Band und Flecht Artikel Industrie, Berlin, and was responsible for the yarn allocations for the whole of the German Textile Narrow Fabrics Industry, as detailed below.

The following figures supplied by Dr. Lünenschloss, for the year 1938, are of some general interest. Efforts to locate wartime statistics were unsuccessful. It must be noted that these details do not cover the full range of activities regarded in this country as the Narrow Fabrics Industries'. They are limited to ribbons braids, elastics and trimmings, etc. Jacquard circular lace braids are included in the German figures, but in this country have not been regarded as part of the Narrow Fabrics Industry; the German classification of trimmings is probably of wider interpretation than British Narrow Fabric trimmings. on the other hand, the German statistics obviously exclude the heavier types of articles such as machinery belting, fire hose, and probably some of the heavier webbings.

The figures presumably refer to the areas that came under German control, but for convenience they are shown in their present territorial divisions.

A. Number of textile Narrow Fabric firms in Germany and the

German controlled parts of Austria and Czechoslovakia in 1938.

In the British zone	497 works	41.4% of total
" American	27	2.2% of total
" French	119	1.5% of total
" Russian	439	36.6% of total
Austria	68	5.7% of total
Czechoslovakia	151	12.6% of total
Total	1201	100%

B. Approximate proportions of the different classifications:-

Bänder aller art, ohne elastische und seidene und kunstseidene Bänder	28%
Webbs and tapes of all kinds other than elastic, silk or rayon	
Ribbons, silk and rayon	13%
Flechtartikel (ohne elastische)	15, %
Braids (rigid)	
Gummielastische band-und flechtartikel Elastic webs and braids	23%
Posamentierwaren	16%
Fancy gimps, braids, trimmings and fringes	
Maschinengeklöppelte Spitzen	5%
Jacquard circular lace braids	100%

C. Approximate number of employees:

Male	12,000
Female	<u>18,000</u>
	30,000

of which 60% in similar proportions was in the British zone.

D. Annual production figures in kilos and ReichMarks.

Kg.	R.M. in 1,000	%	in 1,000	%
British zone	10,265	54.8	119,700	56.0
American	770	4.1	89,540	4.0
French	320	1.7	3,800	1.8
Russian	4,727	25.3	53,160	24.9
Austria	810	4.3	9,100	4.3
Czechoslovakia	<u>1,840</u>	<u>9.8</u>	<u>19,200</u>	<u>9.0</u>
	18,732			213,500

E. Divided between Home Trade and Export.

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	Home Trade (1000 R. M. %)		Export (1000 R. M.)	%
British zone 15.5	101,200	84.5	18,500	
American 10.5	11,040	89.5	1,300	
French Russian Austria Czechoslovakia	48,760 9100 - <u>19,200</u> 189,300	91.7	4,400	8.3
			21,200	

No figures available.

Export markets in their order of importance were given as:

England, Holland, Sweden, Denmark, Norway, Finland, Belgium, Switzerland, Italy, France, Czechoslovakia, Austria, Yugoslavia, Greece, Rumania, Bulgaria, Hungary, Turkey, South America, Central America, Canada, U.S.A. Australia, Union of South Africa, India.

All enquiries indicated that the peak export years were 1928 to 1930. Exports then steadily declined to 1938, on which the foregoing figures are based.

Where further statistics were collected, they are given later in the report in the section to which they refer.

Wartime organization

There did not appear to have been as much planned production for war purposes as in this country although, of course, the Industry had been engaged on some Government contracts. There was little evidence of standard types being introduced to economise materials and productive capacity, etc.

There was no Concentration scheme comparable to that undertaken in this country.

Lack of raw materials limited production after the war, and for the most

Lack of raw materials limited production after the war, and for the most part the firms were working on stocks which must have been fairly extensive at the time hostilities ceased, although a few, working for essential purposes, were receiving supplies of raw materials. Estimates as to how long stocks would last at existing consumption rates varied between two and six months for different firms.

It was stated that Trade Unions had virtually ceased to exist and that Employers' Associations had come under Government control in the early days of the Nazi regime.

It is of some interest to note that during the war the Germans had arranged to carry out, as soon as possible, an investigation of the British Narrow Fabrics Industry, and during the course of the investigations contact was established with one or two individuals who had been selected for the purpose.

Materials Used

Owing to the lack of cotton, considerable use had been made of rayons and various substitutes.

Of these, the principal was Zellwolle, a spun staple fibre rayon being used as a substitute for cotton. In this capacity it was not regarded as entirely satisfactory because of the lower tensile strength and the greater tendency to clog machinery with loose lint. The view was expressed that smallware manufacturers would welcome an early return to cotton yarns.

Continuous filament rayon was in use, but to rather less than the normal extent because of production difficulties of this type of yarn in Germany at the time. Glass yarns were also noted.

The use of plastics had developed, partly from sheer necessity* Flat strip plastic yarns (of textile out cellulose film type) were being employed for purposes for which they had been used prior to the war, i.e, hat and fancy braids.. etc.

Paper yarns were used extensively, particularly for the production of webbing for ladies' belts.

Most of the small amount of rubber thread that was left was of the "Buna" synthetic type.

In the natural fibres were found a certain amount of condenser cotton waste yarns, coarse yarns spun from low grade flax, and some hemp.

PART III.

(a) Machinery of General Interest

Preparatory Processes

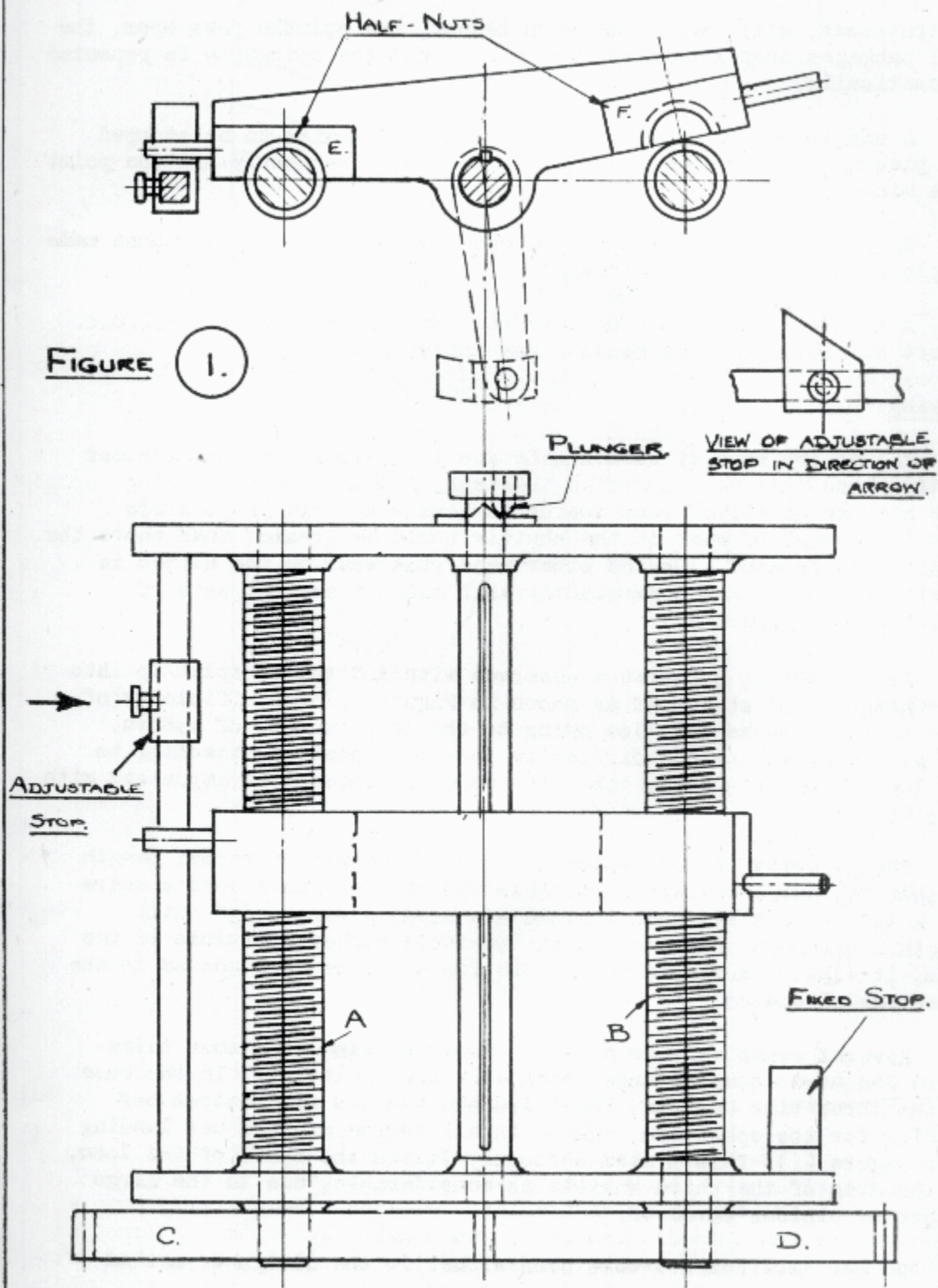
Very little development was noted in the methods of winding, warping and filling, but some items of special interest are mentioned in the Sectional Surveys.

Of the warping machines produced in recent years, many are designed for the warp to be traversed to the beam by hand, although the beam itself is power driven and operated by a foot clutch.

In general, yarn preparation machinery is of conventional types already well known in this country.

The traverse system used in Gebr. Meyer's warping machinery is of interest (see Figure 1). Two buttress thread screws A. & B. are driven in opposite directions by two gears C. & D. These screws drive the traverse table by means of two half nuts E. & F attached to the centre spindle; only one nut is allowed to engage at any one time. As the table is carried along in one direction it comes into contact with an adjustable cam stop which forces the swivel over on to the other nut and screw, thus causing the table to traverse back in the opposite direction. To prevent the nut remaining half way., a spring loaded ball, on a lever is attached to the end of the swivel shaft, where it contacts a V shaped block to ensure that as one nut is forced out the other nut makes quick contact. This system is easily adjustable for width of package and gives an even build up.

There had been some adoption of Hacoba automatic winding machines made by the Engineering section of Halstenbach & Co. who catered, with modified types of machines, for the slightly different requirements, i.e. one type for weft supplies for wide looms, another for braiding machine bobbins, and a third for quills for smallware looms. Each type is assembled in units of four spindles. From hoppers the empty centres are released automatically into a carriage which feeds them on to the winding spindles. As soon as they are gripped between the jaws of the spindles the yarn is automatically started and winding proceeds for a pre-determined number



TRAVERSE SYSTEM - GEBRÜDER MEYER.

of traverses, after which the yarn is out, the spindle jaws open, the full packages drop into a receiving bin, and the operation is repeated automatically.

A single end yarn breakage causes four spindles to be stopped for piecing up,, but this is unlikely to occur frequently and the point is a minor one.

It is considered advisable to use good centres such as those made of plastic or electron material.

A further description of this machine will be found in B.I.O.S. Report No. 289 on German Textile Machinery firms.

Weaving

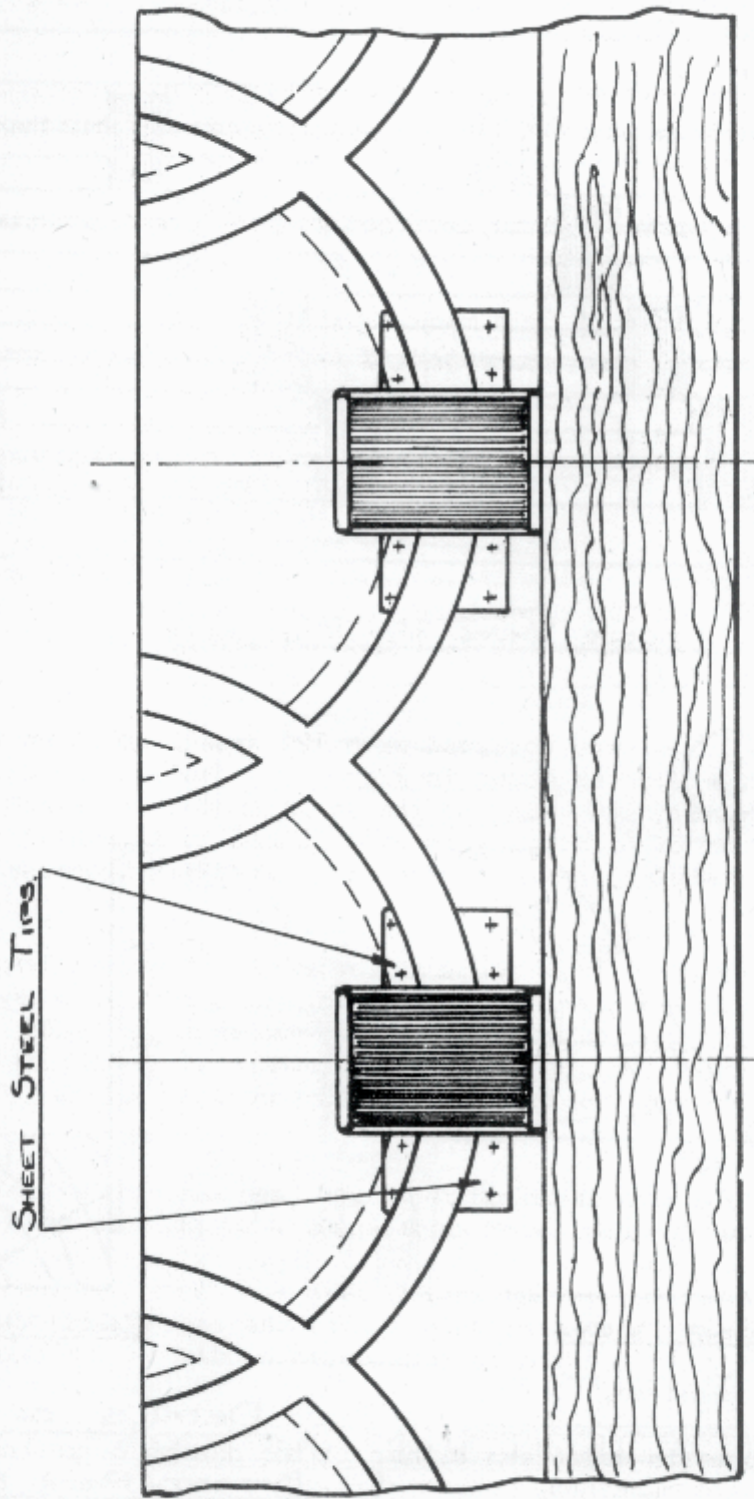
The modern type of batten made for plain looms is the circular shuttle type. At Carl Ludorfs, battens of this type were being made with metal tipped race boards to save wear. It is possible that the amount of wear on the shuttle would be greater than where the normal type is used, On the other hand,, the wear on the batten is considerably less and consequently will outlast several sets of shuttles (see Figure 2.)

At G. Roth's,, looms were observed with 120 spaces split up into four heights and staggered as shown in Figure 3. The efficiency of such a loom must be very low owing to the large number of spaces, and also a great deal of difficulty is experienced in attending to the lower rows of spaces; the firm were not themselves impressed with this type.

The majority of mock space looms are made with a normal length of shuttle, but an exception to this was seen at Funkenberg's where for a 1 3/8 " space a six inch shuttle was used, giving a 3 3/4" quill length. Although this reduced the possible number of spaces in the loom,, it vastly increased the quill life and gave more access to the lower row of spaces.

several examples were noted of two-tier (and even some three tier Jacquard looms arranged with mock space battens. In the case of the three-tier battens, the third shuttle has six pinions per landing for its operation, making in all twelve pinions per landing (see Figure 4.) This system seriously limits the speed of the loom, as the drag of the third shuttle is considerable due to the large number of pinions involved.

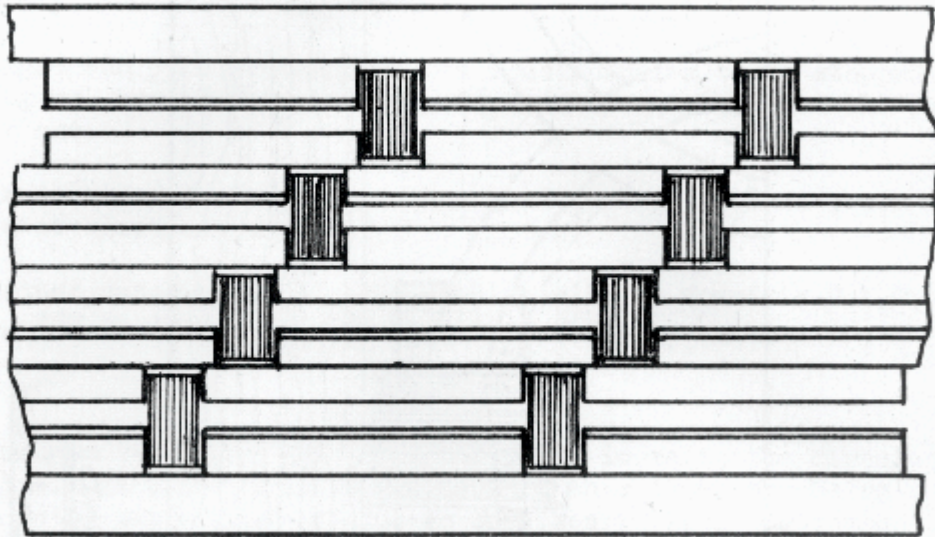
No new developments were seen either in the design or method of operating Jacquard machines.



TIPPED RACE BOARD.
FOR CIRCULAR SHUTTLE BATTEN.

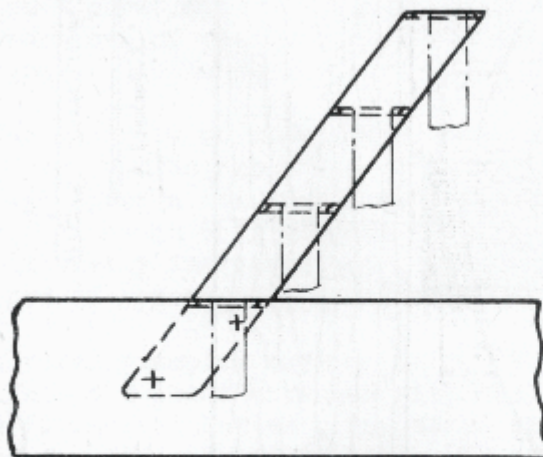
FIGURE 2

120-SPACE BATTEN.

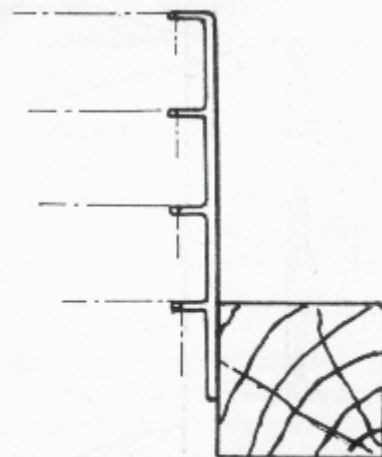


FRONT VIEW OF BATTEN.

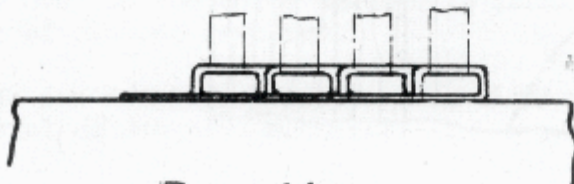
FIGURE (3)



FRONT VIEW.

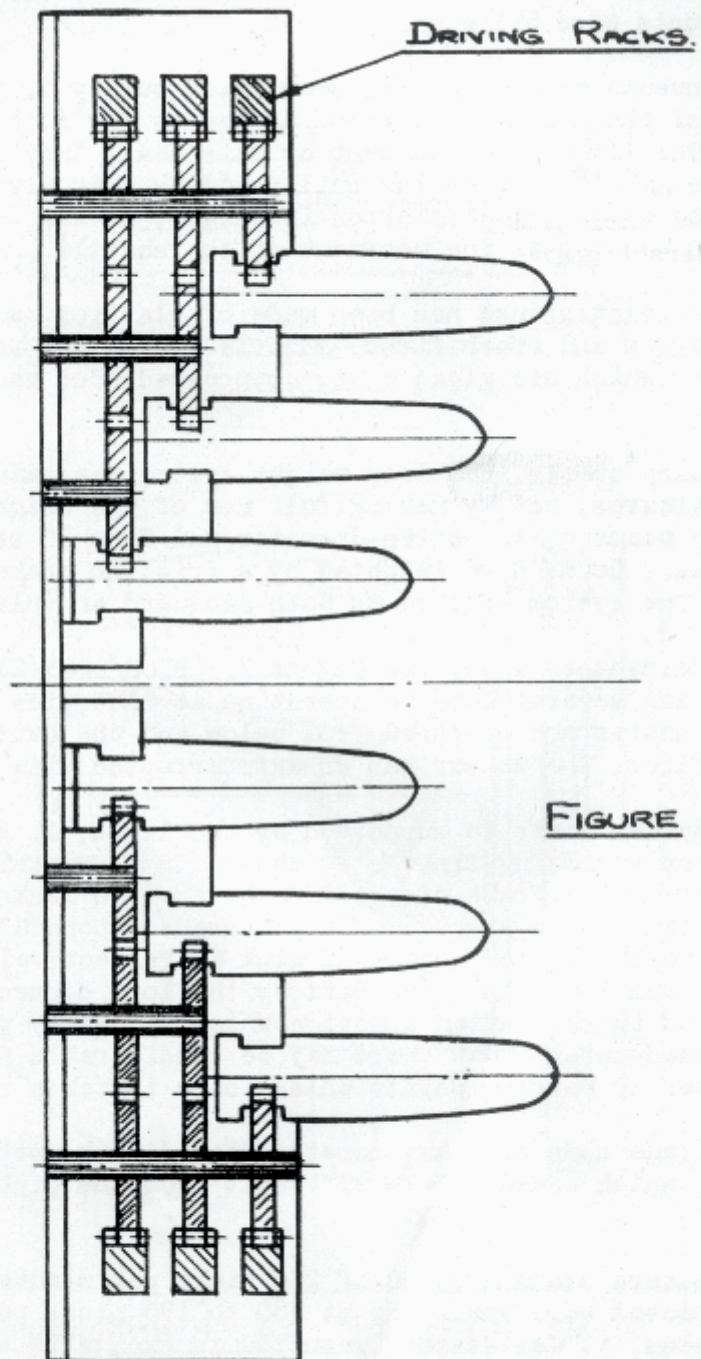


END VIEW.



PLAN VIEW.

DETAILS OF
BREAST-PIECE BRACKET.



FIGURE

4.

THREE TIER - MOCK-SPACE BATTEN.

SIMILAR MECHANISM USED FOR SIX-TIER BATTEN.

Due to the absence of more suitable timbers (e.g. walnut, etc.) batten fronts were being made of oak.

An unusual experiment has been tried out by G. Roth, whereby the axis of the quill is at right angles to the front face of the batten. The firm suggested that by this means they could obtain a greater length of weft on the quill, adding that although the quill rubs on the "shed", the friction is slight, as the weft lies in the same direction as the movement of the shuttle (see Figure 5).

No substantial use has been made of plastics, although at E. Ruggeberg's and other firms, shuttle fronts are made with box wood fronts which are glued on to compressed wood backs (see Figure 6).

For warp creels, the drop weight system was mainly used, even on light smallwares, but by making full use of the height of the rooms warp beams up to 10" in diameter and from 7" to 10" in width were in use. Beams were weighted by a friction brake over the flanges. The system applied to both Jacquard and plain looms.

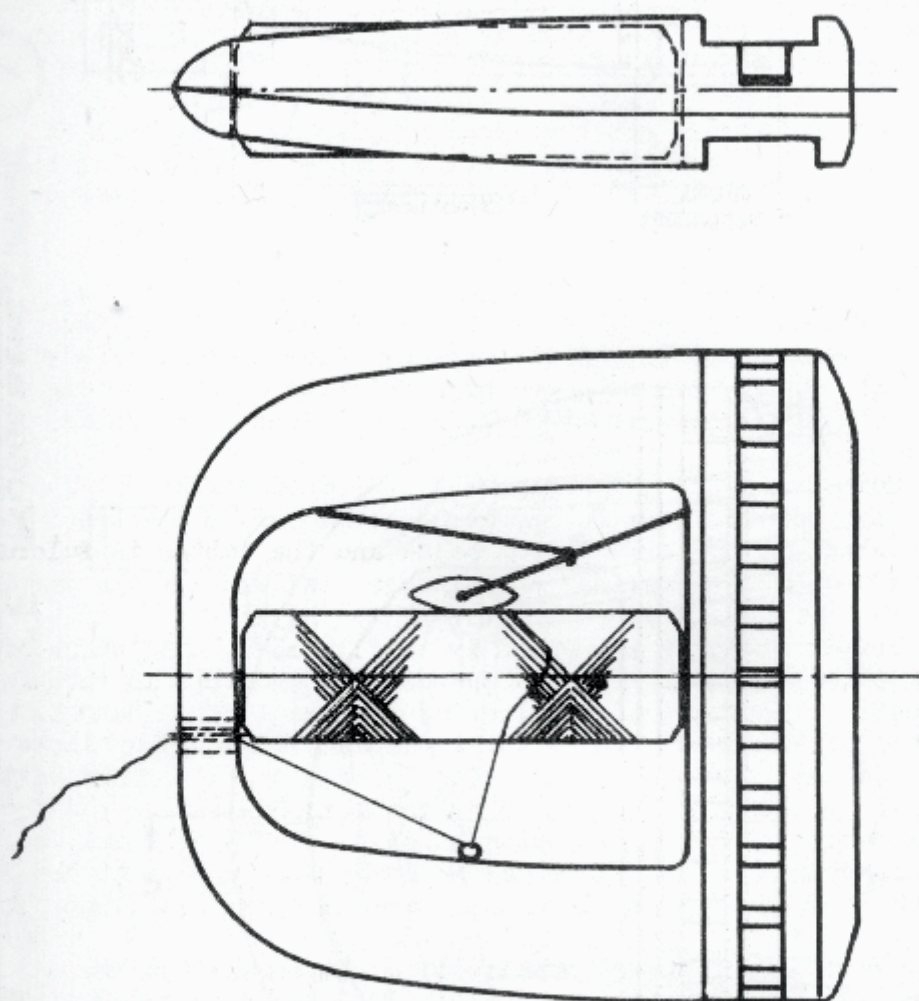
The Reinshagen loom, see Figure 7, (BI04/DOCS/2119/777/1) is of interest., and several were in operation at factories visited. As the heald shafts are operated from below and the batten is fulcrumed near the floor, the weaver has an uninterrupted view of the warps.

The batten chair is supported by two links, A. & B, which are connected by a spacing link C. at the bottom, and this in turn is suspended from the frame of the loom by the two links D. and E. A further link F. is pivoted on the frame and connected by links G. and H. to the batten chair and link E. respectively. The batten is driven from the main crankshaft by the long connecting rod K. This imparts to the batten a motion which is nearly parallel, but has the disadvantage that there may be considerable wear at the large number of bearing points unless care is taken in oiling.

The frame ends of heavy construction dampen most of the vibration, which would otherwise result from the high speed of the loom.

The makers claim a speed of 250 picks per minute, but the looms inspected were operating at 180 to 190 picks per minute. Higher speeds., it was stated, resulted in excessive wear and breakage of machine parts., but at the same time the firms using the looms pointed out that these troubles were due to the looms being made of inferior materials rather than to the design.

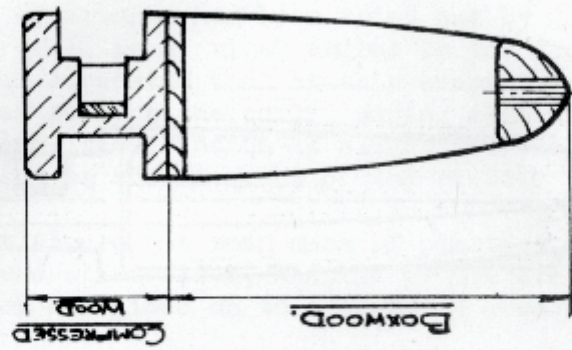
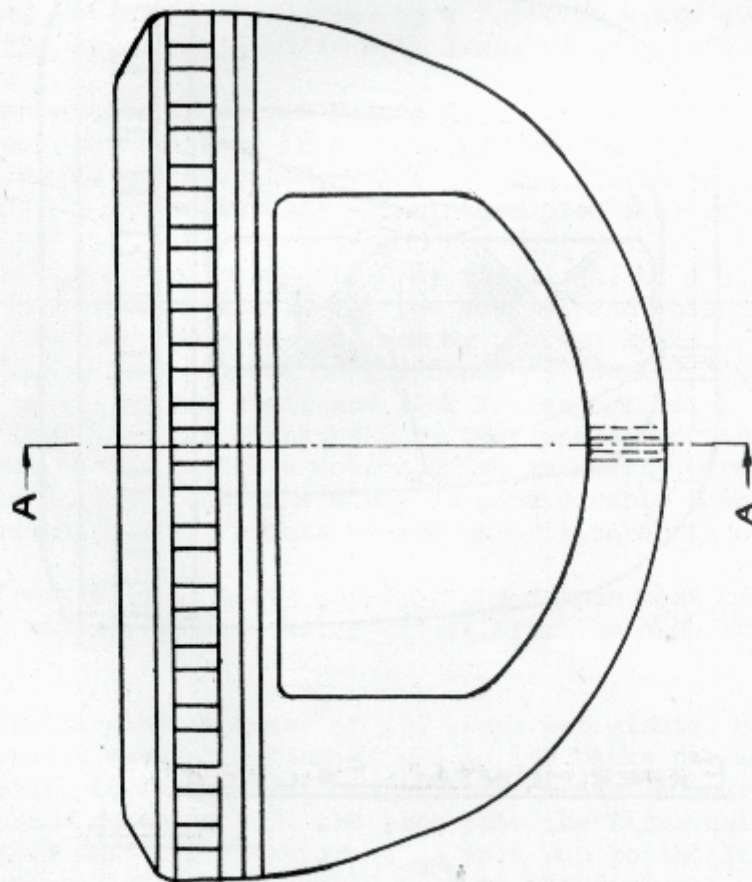
F.I.A.T. Report No. 462 also contains a reference to this loom.



EXPERIMENTAL SHUTTLE -
(ROTH).

FIGURE (5)

FIGURE (6.)



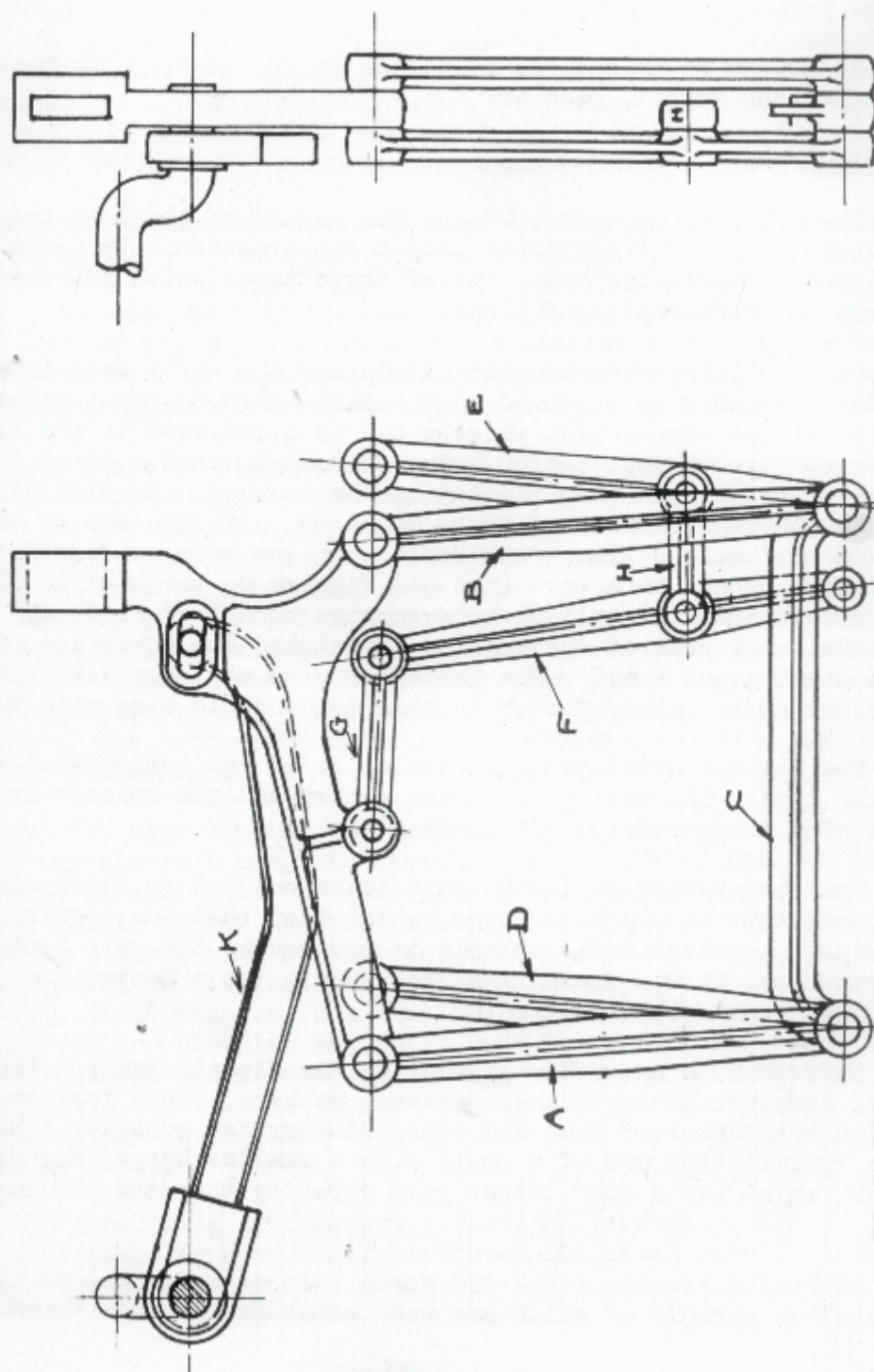
SECTION A-A

BUILT-UP SHUTTLE - E. RUGGEBERG.

SWING BATTEN MOTION.

FIGURE

7.



Copies of two German patents covering shuttleless looms were secured. It has been ascertained from the British patentee that these are merely the counterparts of his British patents. Repeated investigations and enquiries failed to reveal any German firm with experience of these, or any loom employing continuous weft arrangements.

Reference to an endless belt loom is included in the Heavy Solid Woven Belting report, page 45.

Braiding

The braiding machinery in use was mainly of the lead weight tensioning type of traditional Barmen construction. Very few developments have been made, but of those types which have been evolved sane description follows.

(a) Emil Krenzler brought out during the war a machine which has the horn gears so enclosed as to enable them to run completely in oil with an arrangement whereby oil is circulated to the top plate, giving continuous lubrication. The firm, claim that a speed of 225 revs. per minute (450 plaits) can be reached. No firm visited had a large installation of these machines, although one or two had individual "heads". Some favourable opinions were expressed, but criticisms of one firm were that oil flowing on the surface of the gear cover tended to collect an excessive amount of fluff and that the additional cost of the machine outweighed the advantage of claimed increased speed. The Zellwolle used may have been the principal contributory factor to this tendency to clog with fluff.

The spindle developed by Krenzler is of the compression spring tension type. The spring is in the centre and the release is by means of a trigger carrying a yarn guide.

This tensioning system is said to be subject to fluff clogging also, but this should be reduced by the fact that the opening to the compression spring in the spindle is covered by the yarn bobbin. Nevertheless, it was stated that the spring was affected and irregular tensioning resulted.

This machine has a horngear of 85 mm. diameter against the 69 mm diameter of the standard Barmen machine. This feature, coupled with the fact that the tensioning system occupies a smaller space, permits the use of a quill with a smaller barrel and larger flange, which has a much larger yarn capacity than the old style quill.

See B.I.O.S. Report No, 289 for a further reference to this machine, an example of which has been exhibited in this country.

(b) The Hertzog machine,, for which a higher speed was claimed than for the conventional type, is of the high horn gear variety, i.e. the horn is above the top plate of the machine and has four semicircular notches instead of the usual longitudinal slots. The foot of the spindle is the reverse of the traditional Barmen type in that the spigot is between the two webs and the knife is underneath. In working, the two webs of the spindle foot fit over the horngear, the spigot fitting into the notches, the guiding being by means of the knife travelling in the slotted track. This is not actually a new machine., being of a type which was manufactured in Belgium for many years before the war, and which is now manufactured in this country.

It was noted that the outer part of the top plate was made of plastic material.

(c) The Guido Horn machine works on a principle entirely different from that of the Maypole braider, the bobbins being mounted on two concentric sets of carriers which move with truly circular motion, thus permitting very much higher braiding speeds.

The inner set of bobbins is mounted at a higher level than the outer, each bobbin being on a separate carrier which runs in a groove cut in the top of a circular wall or rim cast into the base of the machine. Gear teeth are cut on the bottom outside edge of these bobbin carriers and engage with a set of fibre bevel gears mounted radially and located outside the wall on which the carriers run. At regular intervals in this wall are slots about one inch wide and three inches deep; the carriers are passed over these slots by the drive of the fibre bevels, the segment of the gear on the bottom of the carrier being just long enough to engage with two bevels at the same time.

In the "C" type machine the outer carriers are mounted at regular intervals on a complete circular casting which rotates in the opposite direction to the inner carriers. Each carrier consists of a bobbin holder mounted on the rotating circular casting but below it. Above each carrier and moving with it is mounted a bevel gear wheel in vertical plane at right angles to the radius of the machine , which engages in a stationary ring bevel lying just above the rotating circular casting. From the bobbin the yarn is led on the outside of the machine through an eye in the centre of the bevel wheel and then to another eye in a lug fixed to the inner side of that wheel, but projecting beyond it, and thence to the braiding point.

As the outer ring of carriers rotates horizontally, the simultaneous circular movement imparted to the bevel wheels raises and lowers the yarn which, at its lowest point, is at the bottom

or one of the slots in the wall. where on the inner carriers run and, whilst it is within that slot, one of the inner carriers passes over it,

This type of machine can braid only under one over one under one over two, or under one over three.

A variation of this machine, in the "N" type, deflected the yarns in a different manner. In this type the inner carriers are mounted as in the "C" type machine but the outer carriers are entirely different. The deflecting arms are dogleg with arms of unequal length, the shorter arm carrying the yarn bobbin from which the yarn is led through guides to the top of the longer arm and from there to the braiding point. These levers are mounted with their length at right angles to the radii of the machine and the whole machine is encased by a circular wall about four inches deep. The crank levers are swung at their angle and move in an arc about this pivot. on the longer arm at about one third of its length from the pivot is mounted a pin and roller which runs in a cam path out in the encasing iron wall. The shape of the cam path determines the point at which the head of the arm is lowered, thus allowing the inner carriage to pass over the yarns from the outer bobbins. With this machine braids of any form of construction can be produced., according to the path of the cam.

The yarn capacity per carrier in each type of machine was approximately 4 ounces.

This deflecting arm type of machine appears to have been first developed by Ritterhaus & Blecher some thirty years ago, but that firm did not pursue the development; the general principle of all machines of this type was first evolved by the Standard machine Works, of Nottingham, from whose originals Guido Horn developed his machines. Similar types are produced in this country.

For machines of this type it is claimed that they have a very high output - about 1,200 plaits per minute on the 16 spindle machine, but they are very much bigger than the Barmen types; it is consequently problematical whether the output for a given area of floor space is any higher than with equipment of the conventional type. Consideration should be given to the amount of maintenance work that appeared to be necessary on these machines, particularly after the first two or three years. Possibly materials used in the construction and wartime conditions emphasized this point.

Instances were encountered where the bobbins for these machines were wound to measured lengths so that all the empty bobbins could be taken off and full ones inserted at one time. Opinions differed regarding the adaptability of the machine. It is not considered,

however, that these machines are adaptable to produce a wide range of goods without a considerable amount of re-setting when changing from one type of article to another. One firm stated that the machines were only suitable for hard, tightly braided material such as blind cord, whilst another stated that, by suitable tensioning control, braids for boot and shoe laces could be produced. In another instance (Arthur Huppertsberg) the Guido Horn machines have been used for producing brace end braids, but the firm had reverted to ordinary braiders for this class of work.

In connection with his machine, Guido Horn has registered British patents numbered 406931 and 24190/33.

The investigations indicate that the three types of braiding machines described in this Section have probably been adopted more by cable manufacturers than by smallwares manufacturers.

Hanking, Spooling and Measuring Machines for Narrow Fabrics

The firm of W. Quadt was found to be a useful maker of machines under this heading. Their units for the different purposes could be assembled in alternative ways to suit individual needs. For elastics the type of measuring machine most commonly used is illustrated in Figure 8, which shows a drum of measured circumference which operates an indicator at the top of the machine.

To prevent slip, pressure between the material to be measured and the drum is applied by an endless belt passing round two rollers, one of which is adjustable. This machine will take ribbons up to 6" in width.

Another interesting machine by this firm combined units for drawing off, measuring, spooling and making-up. The first stage units were of slightly varied designs for use in winding either from coils, hanks, or straight from the bin. For use with loose hanks, the swift was made on the umbrella principle. When collapsed, it could be inserted in the hank and expanded to the required diameter. At the next stage in the combination, the tape was measured in the normal way by passing through rollers with a clock attachment which was also, in some cases, fitted with a bell and a stopping device capable of being set for predetermined lengths. The final unit for winding-on varied slightly between types, depending upon whether cards, bobbins, or cheeses were required. The cheese making unit was fitted with an ingenious device which permitted the flange to be removed and the spindle collapsed, thereby allowing the package to be readily doffed. Slots in the flanges of the collapsible spool allowed strands of string to be laid in before winding commenced, so that the finished package

could be easily tied at appropriate points. Such a package is illustrated in one of the photographs on page 26. (Figure 9).

The operation controls were interesting features. A lever automatically applied brakes to both the drawing-off and the winding-on units, thus preventing over-running. The winding speed was controlled from two cone pulleys. The operator could control the winding speed, the stopping and starting motion, and the brakes, and could also doff the completed packages from the same position at one end of the machine. In the ordinary way, movement from this position was only necessary for replacing feed packages or containers.

Illustrations of Quadt units are on page 26. It should be noted that these do not illustrate the full combination described above.

One firm (Villbrandt & Zehnder, A.G.) have developed an automatic card wrapping machine suitable for wrapping elastic braid and similar materials. This machine, which is fully automatic, was seen wrapping three metres of elastic braid in fourteen coils on each card. It was operating at the rate of 900 cards per hour. The elastic was fed from a roll at the back and, apart from filling the hopper with cards, no attention was required from the operative.

The machine was operated by a series of tracks on a large barrel in the head. The number of laps per card was controlled by a stepped cam, and it was necessary to change this cam if the number of laps per card had to be altered, but it was not possible to make changes to suit different sizes of cards.

The elastic was cut off by a rotating steel knife driven by a fractional H.P. motor. A counting device was incorporated with the machine.

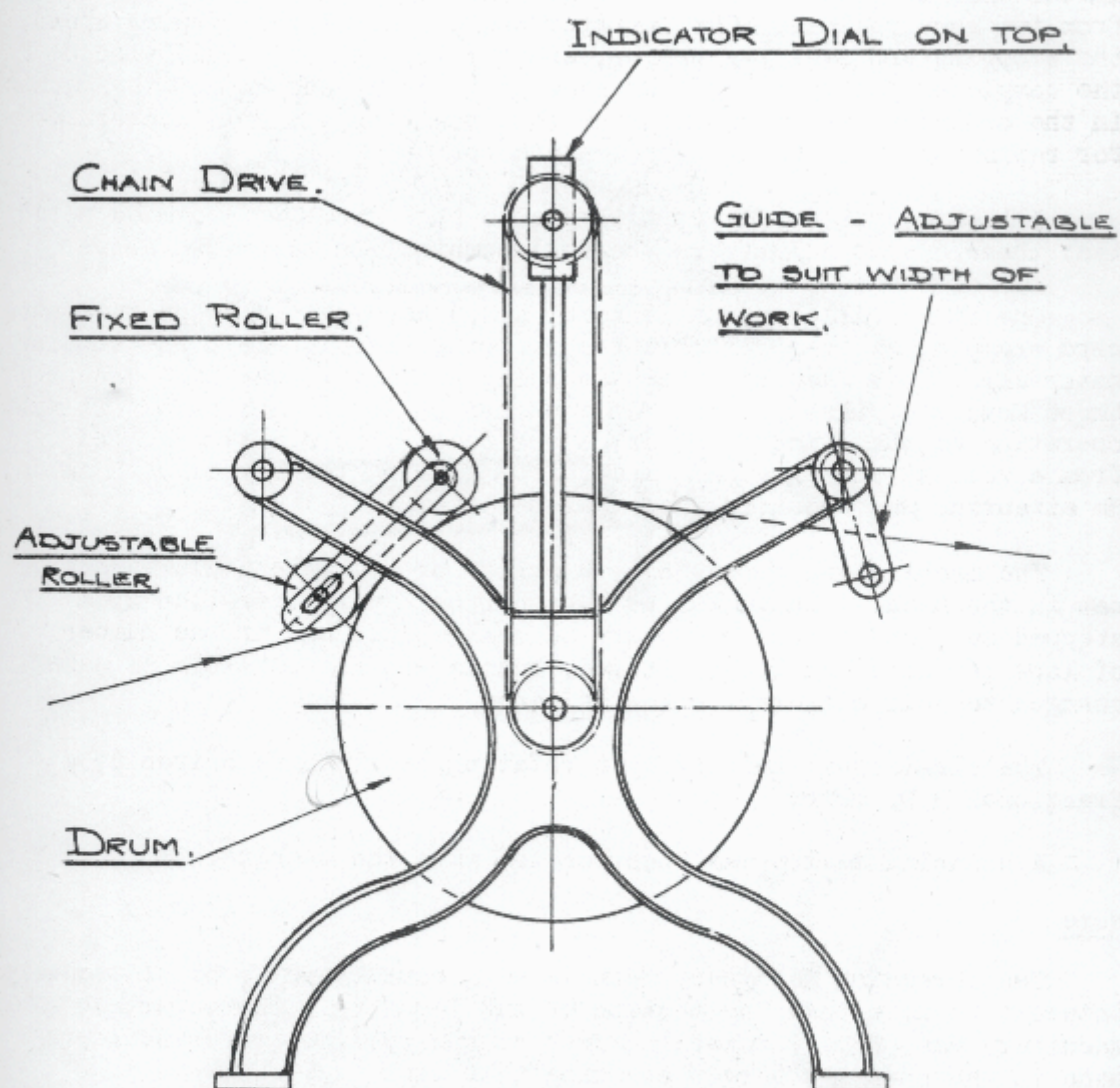
Note

The foregoing machinery details were considered to be of probable interest to more than one section of the Industry. Where further machinery was of particular interest to one section, references are made in the specific survey covering that section.

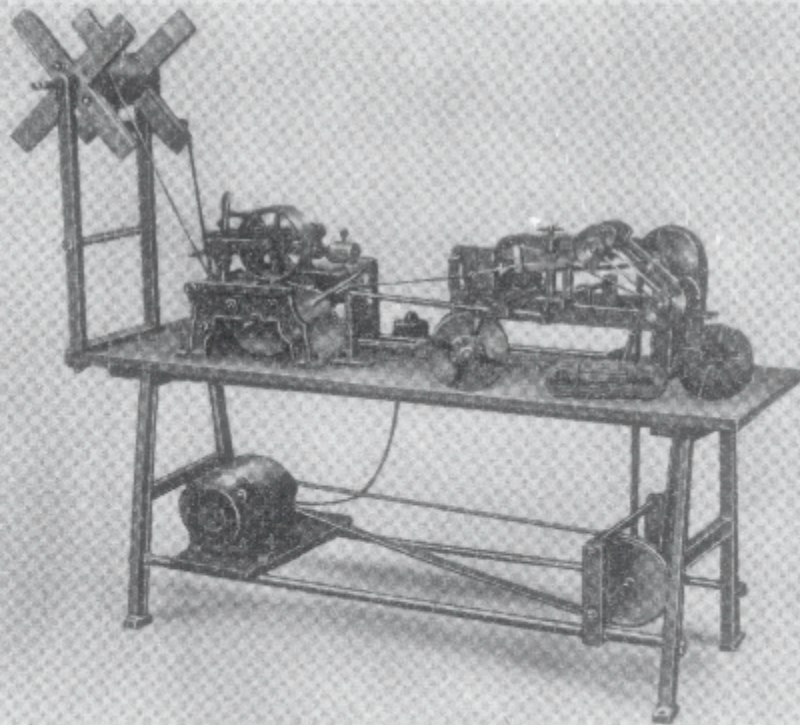
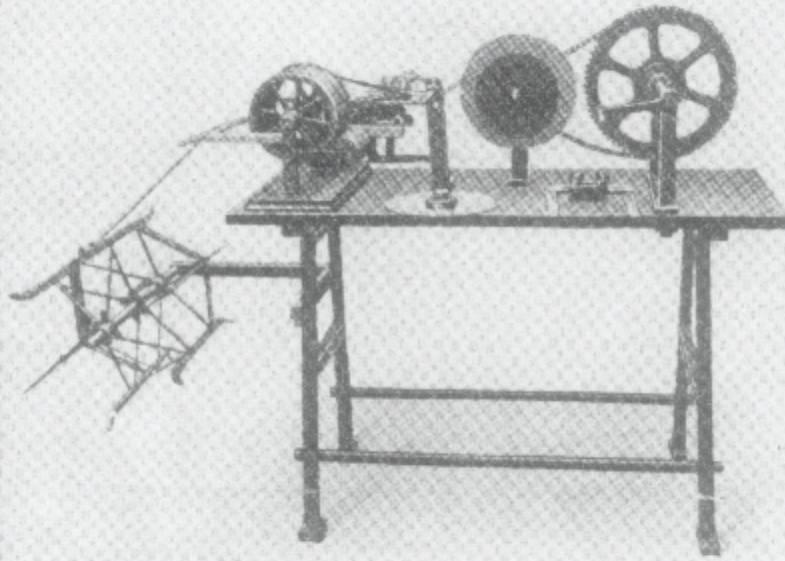
(b) Narrow Fabric Machinery Makers

As the greater part of the Industry is situated in the Ruhr, the damage suffered by the German Narrow Fabric textile machinery makers was extensive. It is therefore easily understood that in order to maintain some production the manufacturers are content to concentrate on pre-war designs rather than experiment with new patterns which would take a considerable time to put into production.

FIGURE (8.)



MEASURING MACHINE - WILHELM QUADT.

MEASURING & MAKING-UP MACHINES - (W. QUADT)

Because of the extensive damage and the consequent reduction in labour employed in the Industry, any survey at this stage can only be of a provisional character and cannot give a true indication of pre-war capabilities.

There is no association of these firms whereby a form of standardisation could be reached, and no reliable information could be gleaned concerning pre-war conditions.

Gebr. Mayer, well known as manufacturers of all types of winding machines, principally for the Smallware Industry, had been substantially damaged but were engaged on reconditioning damaged machines.

E. Ruggeberg's, one of the more important smallware loom builders, had been very heavily damaged, but was in the early stages of reconstruction. E. Finkensieper and E. Blasberg were similarly placed. P. F. Reinshagen, on the other hand, although 90% destroyed in 1943, had recovered sufficiently to employ 55 people. The equipment of this firm was good considering the difficulties they had encountered in replacing plant, etc. They were the only loom builders with any real production of looms.

As previously mentioned, no attempt had been made to produce a single-head small re loom.

Generally speaking,, the plant and lay-out of the machinery firms in the Wuppertal area was good,, especially the gear-cutting and cam-milling sections. Nearly all the more recent machines had self-contained motor drives which, by the elimination of belts and shafting, -improved the lighting conditions.

As regards braiding machine makers,, Emil Krenzler had one factory undamaged and was able to maintain some activity on maintenance and repairs. Korting Nachf, Wilhelm Steeger and Wilhelm Korting were also able to maintain some activity.

The firm of Herman Dickerhoff, formerly makers of finishing and ancillary plant, was completely destroyed, but was considering the possibilities of re-starting.

W. Quadt,, of Wuppertal, specialised on machines for coiling and measuring. The factory had been partly damaged and repaired.

Villbrandt & Zehnder, A.G., of Wuppertal although manufacturers of webs and braids., had also,- constructed some machines and devices of general interest.

The issue of yarn materials for machinery makers is now regulated by the Control authorities, from whom a licence to operate is necessary.

The impression gained was that there had been less direction on to war work in the engineering factories than in similar concerns in Britain. Wages, however, had been stabilized at approximately 1 mark per hour for men. Although there were no Trade Unions, shop representatives were allowed, but they were unable to make any combined efforts.

Although wages were stabilized, prices of machinery have risen approximately 30%. This may be due in part to the difficulties in obtaining correct sizes and supplies of material, etc.

PART IV

SECTIONAL SURVEYS

Fire Hose Industry

General Remarks

So much of the productive capacity of the trade was in the Russian zone that the remaining three zones cannot be self-supporting in Fire Hose unless further looms are added. Already there is a demand that is not being met. All German hose loom manufacturers are situated in the Russian zone.

During the war, the factories, due to shortage of hemp and absence of cotton, were never so heavily engaged as British factories. Many worked only one shift.

Interrogations about all zones and direct observations produced no evidence that the Germans had any new types of hose or new methods of production. There was much to indicate that they were less advanced and less efficient than this country. Percolation on their hoses was less than the normal British standard, but this had only been gained at the expense of other desirable qualities.

As far as can be estimated the German Fire Hose trade consisted of the firms shown on the schedule overleaf.

It will be seen that out of a total of about 450 looms, only 77 are in the British, French or American zones. Of these only 20 are in the British and these had not been operated for a year.